podia, as has been done by Stimpson. The gastric region is narrow and projects far forward as in the Maioids. The expansions on the sides of the carapax, which give it a Cancroid form, are thin, and contain none of the internal organs; and their removal would give the carapax very much the form of that of *Cryptopodia*.

XXVII.—*On some new Species of Graptolites.* By Henry Alleyne Nicholson, M.D., D.Sc., M.A., F.G.S.*

[Plate XI.]

Having recently discovered a considerable number of new forms of Graptolites, I purpose in the following communication giving a short diagnosis of the more remarkable ones amongst them, reserving a more detailed description for another occasion. To the twenty-four species which I formerly described from the Skiddaw Slates (Quart. Journ. Geol. Soc. vol. xxiv. p. 125) I have now to add seven new species; and I have also detected *Diplograpsus bicornis*, Hall, and *Phyllograpsus Anna*, Hall, thus raising the total number of Graptolites from this formation to thirty-three. To the rich Graptolitic fauna of the mudstones of the Coniston series I have three new forms to add, making with those I have previously described a total of twenty-seven species (see Quart. Journ. Geol. Soc. vol. xxiv. p. 521). Finally, I have a few new species from the Upper Llandeilo rocks of Dumfriesshire.

Trigonograpsus, gen. nov. Pl. XI. fig. 6.

Gen. char. Frond simple, diprionidian, rapidly tapering towards the base, and having perfectly plain lateral margins without denticles. Cell-partitions alternating with one another, and springing from an undulating or zigzag solid axis. A common canal is probably present, in which case the axis must be excentric; but the evidence on this point is incomplete.

I have been compelled to found this genus for the reception of a single remarkable form which I have recently found in the Skiddaw Slates, and which differs considerably in structure from both *Retiolites* and *Diplograpsus*. As defined by Barrande, *Retiolites* is distinguished by the triangular shape of the frond on transverse section, by the absence of a solid axis, and by a characteristic punctation of the test. The only form to which these characters apply in their entirety is the familiar *R. Geinitzianus*, Barr.; and it seems safest at present to restrict the genus entirely to this species. *Retiolites venosus*, Hall, and *R. perlatus*, Nich., possess a solid axis, and are likewise distinguished by an extraordinary structure of interlacing reticulated threads, the exact nature of which has yet to be discovered. These will probably have to be placed in a genus by themselves. There remains *R. ensiformis*, Hall, which occurs in the Quebec group of Canada, and which Hall himself hints should probably be removed from *Retiolites*. This last form agrees with the characters of *Trigonograpsus* in having a well-marked solid axis from which the cell-partitions alternately take their origin, in possessing perfectly plain lateral margins, and in the general shape of the frond; and as their geological position is the same, there can be little hesitation about placing the two in the same genus.

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* Communicated by the Author, having been read before Section C of the British Association, at Exeter.

Trigonograpsus lanceolatus, Nich. Pl. XI. fig. 6.

Spec. char. Frond flattened, obtusely pointed at the base, and widening out with great rapidity, the breadth just above the base being more than doubled in the space of half an inch. The lateral margins of the frond are bounded by an elevated line, and are perfectly plain, the cellules being in contact throughout their entire length, so that the cell-mouths are all in a line. Along the centre of the frond runs a strong, zigzag, solid axis, from the opposite angles of which there arise in an alternating manner strong cell-partitions, which run nearly to the margin, and form with the axis as high an angle as 75°. The test shows no traces of a punctated or reticulated structure.

This form is certainly in many respects allied to *Trigonograpsus* (*Retiolites*) *ensiformis*, Hall; but it is separated by very well-marked characters, of which the more important are the nearly straight axis in the latter, and the much greater obliquity of the cellules, which form with the axis an angle of not more than 50°. In our species, on the other hand, the axis is strongly bent from side to side, and the cellules form with it an angle of about 75°.

Loc. Upper beds of the Skiddaw Slates, Ellergill, near Milburn.

Dichograpsus fragilis, Nich. Pl. XI. figs. 1–3.

Spec. char. Frond multibrachiate, consisting of several (probably eight) simple, monoprionidian stipes, arising from a median non-celluliferous funicle. Centrally is placed a small pointed radicle, from which proceed the two primary divisions of the funicle. These subdivide, at a distance of about half a line from the radicle, into two secondary branches, of which one is directed upwards and one downwards. Of these the superior branch appears to give off no tertiary offsets, being directly prolonged into the celluliferous stipe. The inferior branch, on the other hand, gives off two tertiary offsets on the same side, the extremities of the three divisions thus produced becoming celluliferous upon one side. The stipes are extremely slender; the cellules are about twenty in the space of an inch; the cell-mouths are at right angles to the back of the stipe, and the denticles are simply angular, and not mucronate.

This pretty little species is distinguished from all the other members of the genus by its very minute size, by its mode of branching, and by the extreme tenuity of the divisions of the funicle and of the celluliferous stipes.

Loc. Upper beds of the Skiddaw Slates, Thornship Beck, near Shap.

Dichograpsus (?) *annulatus*, Nich. Pl. XI. figs. 4 & 5.

Spec. char. Frond compound, branching and rebranching. Base unknown. Branches coming off from one another more or less nearly at right angles, often attaining a length of from four to five inches, and preserving a uniform width of about a line. Cellules from seventy to ninety in the space of an inch. The face of every one of the stipes is crossed by a number of transverse, sometimes slightly wavy, ridges, amounting to the above number in the inch; but the state of preservation of the specimens is such that it is impossible to determine whether these are the cell-partitions or are the mouths of the cellules shown in a scalariform view. In the former case the direction of the cellules would be nearly transverse to that of the stipes. The margins of the stipes, however, are quite plain and exhibit no denticles; so that the latter view would appear to be the correct one.

This singular form is recognizable, even in small fragments, by the presence of the above-named transverse ridges, which give the stipes somewhat of the aspect of a ringed worm. Whichever view be adopted of the nature of these ridges, they unquestionably mark the position of the cellules, which are thus seen to reach the extraordinary number of not far from 100 in the space of an inch. The central portion of the frond is not shown in any of my specimens (the best of which was discovered by Mr. Christopherson, of Keswick); and it is therefore impossible to fix finally the generic position of the species. Its mode of branching, however, corresponds closely with that of *Dichograpsus*; and as this genus has its home in the Skiddaw Slates, the position of our form is most probably here.

Loc. Rare in the Skiddaw Slates of Barrow, near Braithwaite, and of Wath Brow, near Keswick.

Diplograpsus Hopkinsoni, Nich. Pl. XI. fig. 7.

Spec. char. Frond diprionidian, from half to three-quarters of an inch in length exclusive of the distal prolongation of the solid axis, and having a breadth of from one to one and a half line. Base ornamented with a minute triangular radicle, flanked by two long, curved, setiform processes, many times greater in length than the central mucro. Cellules about twenty-four in the space of an inch, obtusely triangular in shape, terminating in long drawn-out tips or denticles, which are obtusely pointed and are usually slightly bent downwards, but which do not terminate in distinct spines.

The specimens of this form which had previously come under my notice were confounded by me with *D. mucronatus*, Hall, to which they bore, in the shape of the cellules, a considerable resemblance. Having now, however, discovered more perfect specimens, in which the base is exhibited, I have been led to alter this opinion. *D. Hopkinsoni* is altogether larger and broader than *D. mucronatus*, the cellules are larger and fewer to the inch, whilst the denticles are turned downwards, and do not terminate in spines. Finally, *D. mucronatus* does not possess the long basal spines which are so characteristic of *D. Hopkinsoni*. These spines are sometimes of great length (a quarter of an inch in one specimen), and in all their characters they resemble those of *Climacograpsus antennarius*, Hall, which is a characteristic species in the Skiddaw Slates. I have named this form after Mr. John Hopkinson, who has recently written an excellent paper on the subject of Graptolites.

Loc. Skiddaw Slates of Outerside, near Keswick.

Diplograpsus armatus, Nich. Pl. XI. fig. 8.

Spec. char. Frond diprionidian, varying in length from four lines to more than one inch, exclusive of the distal prolongation of the axis. Breadth, exclusive of the spines, from one to one and a half line. Base obtusely pointed, with a single short radicle. Cellules extremely remote, not exceeding twelve in the space of an inch, and having their apices furnished with broad, tapering, slightly deflexed spines, which attain the comparatively enormous length of from one to two lines; so that the breadth of a full-grown specimen, including the spines, may be as much as five lines.

All the specimens which I have of this species are derived from the upper beds of the Skiddaw Slates, and are both poorly preserved and a good deal distorted by cleavage. The great remoteness of the cellules, however, and the extraordinary length of their spiny appendages are characters which distinguish this from all other forms.

Loc. Upper beds of the Skiddaw Slates, Thornship Beck, near Shap.

Diplograpsus Hughesi, Nich. Pl. XI. figs. 9 & 10.

Spec. char. Frond diprionidian, about one quarter of an inch in length, and one-sixteenth of an inch in width in the fully developed portion. Base obtusely pointed, apparently without any proximal extension of the solid axis. Frond forming a cylindrical tube, which is divided into two vertical compartments by a longitudinal septum. This septum, in all the *Diplograpsi* with which I am acquainted, is perfectly straight or is very slightly undulated; and its lateral margins appear on the exterior of the test as very slightly wavy or straight lines between the rows of cellules. In the present species, however, the septum must be strongly and sharply bent first to one side and then to the other, since the impressed line on the exterior (which may conveniently be called the "suture") is regularly and strongly bent from side to side so as to be almost zigzag. The common canal is excessively narrow. The base of each cellule is applied to a concavity of the undulating septum, so that a regular alternation is maintained on the two sides of the frond. The cellules are about thirty in the space of an inch, overlapping one another not at all or for an extremely short distance, curved, nearly vertical (or parallel to the axis of the frond), their outer margins strongly convex; the cell-mouths horizontal (or at right angles to the axis of the frond). The test is perfectly smooth.

This extraordinary species reminds us of *D. tamariscus*, Nich., in the characters of the curved, cup-shaped, vertical cellules, with their horizontal cell-mouths and extremely narrow common canal. It is easily distinguished, however, by the undulated (not straight) suture, and by the constant absence of the beautiful transverse striæ which are so characteristic of all examples of *D. tamariscus* which are preserved in relief. I have named the species after my friend Mr. Hughes, of the Geological Survey.

Loc. Graptolitic mudstones of the Coniston series, Skelgill Beck, near Ambleside. (Beautifully preserved in relief.)

Diplograpsus sinuatus, Nich. Pl. XI. fig. 11.

Spec. char. Frond diprionidian, from four to five lines in length, and one line in breadth in the fully developed portion. Base pointed, and furnished with a long straight radicle. Cellules from thirty-six to forty-five in the space of an inch, forming an angle of about 40° with the axis, and overlapping one another for more than two-thirds of their entire length. In shape the cellules are somewhat curved, wide at the base, contracted in the middle of their length, and expanding into rounded knobs towards the cell-mouths.

This species is only known to me by some two or three specimens, in a state of high relief, from the mudstones of the Coniston series. The characteristic of the species is the peculiar sinuous outline of the cellules, produced by the undulating cell-partitions.

Loc. Graptolitic mudstones of the Coniston series, Skelgill Beck, near Ambleside.

Diplograpsus bimucronatus, Nich. Pl. XI. figs. 12 & 12′.

Spec. char. Frond diprionidian, from one to two inches in length, and attaining in the fully-grown portion of large specimens a width of over two lines, exclusive of the spines from the cell-mouths. Base obtusely pointed. Cellules from twenty-eight to thirty in the space of an inch, broad at the base and gradually tapering towards the cell-mouths, so as to form long extended denticles, the upper margins of which are nearly straight and are at right angles to the axis, whilst the inferior margins are curved and form an angle of about 45° with the axis. The extremity of each denticle is furnished with *two* long flexible spines, which are usually bent downwards, and sometimes attain the extraordinary length of more than one line and a half; so that the breadth of the entire frond, including the spines, may be as much as a quarter of an inch. The spines increase regularly in length as the distal extremity of the frond is approached.

In the general shape of the cellules, *D. bimucronatus* closely resembles *D. mucronatus*, Hall, from which it is distinguished by the much greater size of the frond and by the possession of two spines proceeding from the extremity of each denticle, the latter species possessing but one spine, and that a smaller one, to each cellule. From *D. quadrimucronatus*, Hall, in which each cellule has two spines, our species is readily separated by the characters of the cellules.

Loc. Not uncommon in a single bed of anthracitic shale, Glenkiln Burn, Dumfriesshire.

Diplograpsus insectiformis, Nich. Pl. XI. fig. 13.

Spec. char. Frond diprionidian, not exceeding two and a half to three lines in length, averaging two lines, elongate-ovate in shape, tapering towards both extremities, the width in the middle being nearly one line, exclusive of the spines. Base obtusely pointed, with a minute, sometimes double, radicle. Axis apparently not prolonged beyond the distal extremity of the frond. Cellules forty-two in the space of an inch, overlapping one another for about half their entire length, their lower margins straight, inclined to the axis at an angle of not more than about 25°, and having the cell-mouths nearly rectangular to the axis of the frond. Denticles pointed and furnished with rigid straight spines, which are usually directed slightly upwards.

Out of about thirty individuals of this gregarious little species, all upon the same piece of shale, no important departures from the above characters are observable. The small size and ovate shape of the frond, the low angle which the cellules form with the axis, the acutely pointed denticles, and the presence of straight spines at the cell-mouths sufficiently distinguish the species.

Loc. Upper Llandeilo rocks of Dobb's Linn, near Moffat.

Diplograpsus vesiculosus, Nich. Pl. XI. figs. 14 & 15.

Spec. char. Frond diprionidian, the celluliferous portion attaining, in fully grown specimens, a length of from one to two inches, and a breadth of from one-eighth to one-sixth of an inch. The celluliferous margins of the frond are almost parallel till close upon the base, when they converge to form a short obtusely pointed basal process, resembling that of *D. palmeus*, Barr. In the centre of the frond, in place of the ordinary solid axis of the *Diplograpsi*, is a tubular body, bordered laterally by filiform margins. Whether a true solid axis, in the form of a cylindrical filament, is also present, cannot be determined. The axial tube is narrow proximally, but widens out distally till a width of nearly one line may be reached, and on passing finally beyond the celluliferous portion of the frond it is directly prolonged into a long, fusiform, ovate or cylindrical, vesicular dilatation, which is bordered by strong filiform margins. This terminal vesicle, at first narrow, attains a width of from one-tenth to one-fifth of an inch, and then contracts to an acuminate apex. The cellules are in contact throughout their entire length, from twenty-five to thirty in the space of an inch, inclined to the axial tube at an extremely low angle (about 25°). The cell-mouths are nearly parallel to the median line of the frond, and are gently rounded and convex, not forming distinct denticles; so that the celluliferous margin of the frond appears simply as an undulating line.

The external portions of the test appear to have been the strongest portions of the polypary, and are always more strongly defined than the inner.

The name which I have adopted for this extraordinary species appears to be somewhat unfortunate, since it seems to have given rise to the opinion that the presence of a terminal vesicle is the most important or the sole distinguishing character of the species. This distal vesicle is sometimes seen, to a limited extent, in *D. pristis*, His., and in *D. palmeus*, Barr.; and in this respect our species is only remarkable in *always* having the vesicle, and in its very large size. *D. vesiculosus*, however, is totally and entirely distinct from any other *Diplograpsus* known to me, and its characters are recognizable even in very small fragments. It is completely separated from all other forms by the following characters:—1, the parallelism of the celluliferous margins of the frond; 2, the obtusely pointed, triangular basal process; 3, the contiguity of the cellules throughout their entire length; 4, the absence of distinct denticles; 5, the exceedingly small angle which the cellules form with the central line of the frond; 6, the possession of a median axial tube of considerable width, in the place of, or in addition to, a true solid axis; 7, the possession of a terminal dilatation or vesicle, formed by an expansion of the axial tube.

This combination of characters cannot be predicated of any other known form, and is sufficient to place the validity of the species beyond reasonable doubt.

Loc. Upper Llandeilo rocks of Dobb's Linn and Frenchland Burn, near Moffat. Rare in the mudstones of the Coniston series, Skelgill Beck, near Ambleside.

Climacograpsus innotatus, Nich. Pl. XI. figs. 16 & 17.

Spec. char. Frond diprionidian, from three to five lines in length, and little more than half a line in width in its fully developed portion. Base pointed, with a minute radicle. Axis prolonged beyond the distal extremity of the frond. Cell-apertures forming rounded notches, sunk below the general margins of the frond, and from twenty-eight to thirty-five in the space of an inch. The projecting portions of the frond between the notches formed by the cell-mouths are somewhat quadrangular, with the angles rounded off; and from the inferior angle of each arises a short stout spine, which is directed horizontally over the mouth of the cellule below.

This species agrees with *Climacograpsus typicalis*, Hall, in the possession of spines; but it is altogether a much smaller and narrower form, and differs still further in the characters of the cellules.

Loc. Upper Llandeilo rocks of Dobb's Linn, near Moffat.

Climacograpsus tuberculatus, Nich. Pl. XI. fig. 18.

Spec. char. Frond diprionidian, from half to over three-quarters of an inch in length, and of a breadth of about one line in the fully developed portion. The base is pointed, and is provided with three strong tapering spines or mucronate processes, of which the central one is the smallest and constitutes the true radicle, whilst the two lateral ones are nearly rectangular to the axis, and are slightly curved towards their extremities. The cellules are about thirty in the space of an inch, excavated in the substance of the frond, and appearing in a scalariform specimen as linear or elliptical apertures extending across the stipe. Between the rows of cellules on the two lateral surfaces of the frond, the test is furnished with a linear series of tubercles or outward processes of the periderm, which are sometimes square, sometimes more or less triangular in shape. One of these processes arises from, or in the immediate vicinity of, the lateral angle of each cell-aperture.

This form is allied to *C. bicornis*, Hall, but is clearly separated by the lateral tubercles, as well as by the nearly horizontal position of the two lateral spines at the base.

Loc. Rare in the Upper Llandeilo rocks of Dobb's Linn, near Moffat.

Graptolites argenteus, Nich. Pl. XI. fig. 19.

Spec. char. Stipe simple, monoprionidian, commencing proximally in a delicate curved base, and then proceeding in a nearly straight line. Base extremely slender, the cellules having here very much the character of those of *G. Nilssoni*, except that their apices are reflexed. They are long, narrow, and triangular, about eighteen in the space of an inch, the entire length of this portion of the stipe being about four-tenths of an inch. From this point the stipe gradually widens, until a breadth of as much as one line may be reached; but this does not appear to be exceeded. The cellules in the adult portion of the stipe are very closely set (from forty to forty-five in the space of an inch), long, narrow, overlapping one another for more than two-thirds of their entire length, and having their apices reflexed. The basal portion of the cellules is a little wider than the mouth; and the length of a full-grown cellule is about a line, the width not exceeding one-fortieth of an inch. In the distal portion of the stipe the apices of the cellules are not turned down at all. The common canal is extremely narrow; and the cellules form with it an angle of about 35°.

This beautiful species presents a superficial resemblance to *G. priodon*, Bronn. It is distinguished, however, by the slender, linear, sharply curved base, the cellules of which resemble those of *G. Nilssoni*, by the much greater number of cellules to the inch (those of *G. priodon* not exceeding twenty-five, whilst those of *G. argenteus* are from forty to forty-five), by the great comparative length and nearly uniform width of the cellules, and by the great rapidity with which the stipe attains its full dimensions. Further, it is only in the lower portion of the adult part of the stipe that the cellules resemble those of *G. priodon*, since it is only here that they are reflexed at their extremities.

Loc. Abundant, and beautifully preserved in relief, in a single thin band in the mudstones of the Coniston series, Skelgill Beck, near Ambleside.

Didymograpsus affinis, Nich. Pl. XI. fig. 20.

Spec. char. Frond consisting of two extremely slender stipes, each from half to three-quarters of an inch in length, diverging from an initial point, which is provided with a long and pointed radicle of about one line in length. The stipes are very narrow, having a uniform width of from one-fiftieth to one-fortieth of an inch. The cellules are on the opposite side of the frond to the radicle; and the "angle of divergence"* varies from 90° to 150°, the stipes being straight or gently curved. The cellules are about eighteen in the space of an inch, and are indistinguishable in all their characters from those of *G. Nilssoni*, Barr. They are long, narrow, and so arranged that they do not overlap one another at all; the outer cell-walls being inclined to the axis at an angle of not more than 15° to 20°, and being three to four times as long as the cell-mouths, the latter forming short transverse apertures at right angles to the axis.

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* In the specific determination of any *Didymograpsus*, one of the most important points in the diagnosis is found in the "angle of divergence" of the two stipes which compose the frond. It is obvious, however, that the two stipes, diverging from a single point, form *two* angles; and it is equally obvious that this character is absolutely valueless unless the *same* angle be always chosen for purposes of comparison. The ordinary practice, in the case of the *Didymograpsi*, has been to take the *smallest* angle, and to call that the "angle of divergence," or, in cases where the two angles were equal, to take the angle formed by the two stipes on the side on which the cellules were placed. Now, in neither of these cases is it really the same angle which is compared in different species; or, at any rate, it is not necessarily or invariably the same. The proper method of comparison is to take the angle formed by the stipes *on the opposite side of the frond to the radicle*, and to consider that as the "angle of divergence." In this way a constant standard of comparison is obtained, since the radicle always marks the organic base of the frond. A neglect of this obvious point has led to extraordinary confusion amongst the British members of this genus, as I shall point out upon some future occasion. The angle formed by the stipes *upon the same side as the radicle* may conveniently be called the "radicular angle;" and the cellules, in different sections of the *Didymograpsi*, are found to occupy the sides of the angle of divergence or of the radicular angle.

This pretty little species is readily separated from all allied forms (such as *D. nitidus*, Hall, and *D. serratulus*, Hall) by the remote free cellules, which do not overlap one another, by the general shape of the frond, and by the small length and great tenuity of the stipes.

Loc. Lower beds of the Skiddaw Slates, Barff, near Keswick. Upper beds of the Skiddaw Slates, Ellergill, near Milburn; and Eggbeck, near Pooley.

Didymograpsus fasciculatus, Nich. Pl. XI. figs. 21 & 22.

Spec. char. Frond consisting of two simple stipes arising from a short obtuse radicle. The stipes are at first directed horizontally outwards, but are immediately bent downwards towards the radicle, again curving horizontally outwards. The cellules occupy the concave face of each stipe, forming thus the angle of divergence; but, owing to the curvature of the stipes, the amount of this angle can hardly be stated. Each stipe is extremely narrow at first, but gradually widens out till a breadth of nearly one twenty-fourth of an inch may be reached. The common canal is very narrow, but is wider than the cellules. The cellules are excessively long and narrow, curved, following the curvature of the stipe, the cell-mouths being at right angles to the axis of the cellules. The cell-mouths are not more than about twenty-four in the space of an inch in the adult portion of the stipe, and the cellules overlap one another for fully two-thirds of their entire length. An individual cellule, when fully grown, may have the extraordinary length of more than two lines, with a uniform breadth of not more than one-hundredth of an inch. Owing to the great length and narrowness of the cellules, and owing to their inclination being so small that they are nearly parallel to the back of the stipe, the cellules in the distal portion of the stipe appear to form a bundle of long narrow tubes. In consequence of this, a line drawn at right angles to the distal portion of the stipe would exhibit a section of three, or even four, cellules.

This species cannot be confounded with any other, being distinguished by the curiously curved stipes with the cellules on their concave aspect, the latter being nearly parallel to the back of the stipe, and attaining an extraordinary length as compared with their breadth.

Loc. Rare in the upper beds of the Skiddaw Slates, Ellergill, near Milburn, Thornship Beck, near Shap, and Eggbeck, near Pooley.

EXPLANATION OF PLATE XI.

Fig. 1. Specimen of *Dichograpsus fragilis*, n. sp., nat. size.
Fig. 2. The same, enlarged.
Fig. 3. Portion of the same, enlarged still further, to show the cellules.
Fig. 4. Portion of *Dichograpsus annulatus*, n. sp., showing the transverse ridges.
Fig. 5. Portion of the same, enlarged.
Fig. 6. *Trigonograpsus lanceolatus*, n. sp., enlarged.
Fig. 7. *Diplograpsus Hopkinsoni*, n. sp., enlarged.
Fig. 8. *Diplograpsus armatus*, n. sp., enlarged.
Fig. 9. Portion of *Diplograpsus Hughesi*, n. sp., greatly enlarged, to show the cellules.
Fig. 10. *Diplograpsus Hughesi*, enlarged.
Fig. 11. *Diplograpsus sinuatus*, n. sp., enlarged.
Fig. 12. *Diplograpsus bimucronatus*, n. sp., enlarged.
Fig. 12′. Fragment of another specimen of *D. bimucronatus*, enlarged, to show the cellules.
Fig. 13. *Diplograpsus insectiformis*, n. sp., enlarged.
Fig. 14. Upper portion of *Diplograpsus vesiculosus*, n. sp., slightly enlarged. (The serration of the margin in this figure is too pronounced.)
Fig. 15. Portion of *D. vesiculosus*, enlarged, showing the cellules, axial tube, and base.
Fig. 16. *Climacograpsus innotatus*, n. sp., enlarged.
Fig. 17. Portion of *C. innotatus*, greatly enlarged, to show the cellules.
Fig. 18. *Climacograpsus tuberculatus*, n. sp., enlarged.
Fig. 19. *Graptolites argenteus*, n. sp., enlarged.
Fig. 20. *Didymograpsus affinis*, n. sp., enlarged.
Fig. 21. *Didymograpsus fasciculatus*, n. sp., enlarged.
Fig. 22. Portion of *D. fasciculatus*, still further enlarged, to show the cellules.

XXVIII.—*Descriptions of four new Species of Diurnal Lepidoptera of the Genus* Thyca. By A. G. Butler, F.L.S. &c.

Genus Thyca, Wallengren.

1. *Thyca Ithiela*, sp. nov.

♂. Alæ supra nigræ: anticæ velut in *T. Horsfieldii* cinereo plagatæ et maculatæ: posticæ macula magna subcostali subovali aureo-flava apud basin posita, maculis quinque discalibus, serie angulari velut in *T. Horsfieldii* positis, maculisque quinque cinerascentibus semicircularibus submarginalibus; area abdominali cinerea, haud flavo maculata: corpus nigro-cinereum, antennis nigris.

Alæ subtus fere velut in *T. Horsfieldii*, maculis autem posticarum